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Southern Biological Supply Co.,

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517 Decatur Street
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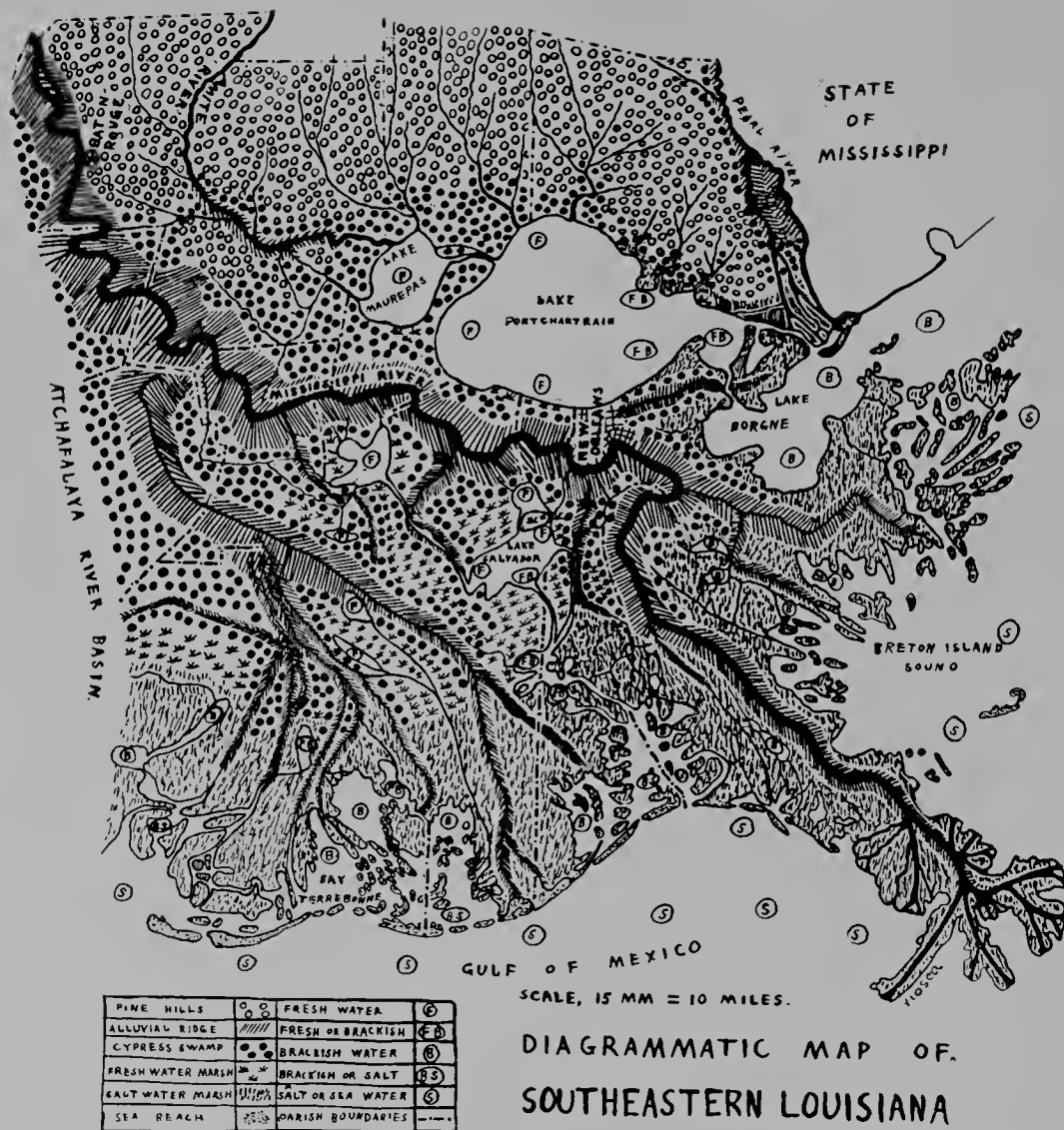
LIVING ANIMALS AND PLANTS
for
AQUICULTURE

Frog Culture Fish Culture
Crayfish Culture
Turtle and Alligator Farming
Muskrat Farming Wild Duck Ponds

April, 1932 Edition

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That portion of the State of Louisiana within a hundred miles radius of the City of New Orleans is perhaps the most diversified region of its size on the face of the earth. Extreme variations of land and water areas can be found within at most a few hours ride. A few inches in elevation may mean more profound changes in the animal and plant life here, than a thousand feet in mountainous country. In fact, the region is far more diversified than it is possible to illustrate on a map of the scale shown. The large majority of the species listed in this catalog, where not reared in captivity, are collected by our own trained organization within the region pictured, although we do not hesitate to go beyond its boundaries when necessary to secure an important species not readily obtained there.

Included in our organization is a staff of trained scientists and field men, some of whom have had as much as twenty years experience in field and laboratory research.

Average Annual Production and Valuation of Louisiana's Aquatic Natural Resources.

(The figures compiled by the Department of Conservation of Louisiana are exclusive of recreational and educational values and other intangible returns, and are expressed in the nearest round numbers.)

Fish	47,000,000 lbs.	\$ 5,500,000
Shrimp.....	50,000,000 lbs.	5,000,000
Frogs	1,000,000 lbs.	500,000
Terrapin, Turtles, Crabs and Miscellaneous.....	1,500,000 lbs.	500,000
Oysters.....	3,000,000 bu.	4,000,000
Muskrat	6,000,000 pelts	5,850,000
Other Furs and Alligators.....	1,000,000 pelts	2,650,000
		<hr/>
		\$24,000,000

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GENERAL ANNOUNCEMENT

The animals and plants described in the following pages are selected primarily for those interested in aquiculture. For animals and plants for the home aquarium or the outdoor lily pond or fountain pool, the customer is referred to our catalog C, which will be sent upon request.

We have many offerings for the large commercial aquatic farmer, the farmer of the future, who wishes to diversify along new, interesting and profitable lines, the progressive farmer who wishes to convert his waste lands into revenue producing areas by rearing thereon, sure crops of aquatic organisms upon which there is always a ready market and no surplus production. It is not our desire here to list everything available along these lines. We specialize primarily in native species which have proven themselves susceptible to artificial cultivation, and a few foreign species which are of world wide fame. If there is anything along these lines which you do not see listed, we can either get it for you or let you know where it can be obtained.

Terms: Our prices are net, cash in advance, F. O. B. New Orleans, and include all packing charges, and shipping cans and crates. Send cash with order, as no live stock is sent C. O. D. To avoid delay, it is a good plan to send also a deposit sufficient to cover prepaid transportation. Any surplus will be returned or credited. **References:** The Whitney Bank, New Orleans; the Commercial Agencies. Ask your bank to look us up. We have been in business seventeen years.

Shipment: Unless otherwise instructed, we ship material by that way which best suits the nature of the articles shipped and the time required for delivery. When other things are equal, we ship by the cheapest way, however, most material of this nature must be forwarded by express.

Claims: Containers and specimens should be checked and inspected immediately upon receipt of goods in the presence of the express agent or witnesses, and a bad order report taken from the express agent in case of shortage, breakage, leakage or death. Satisfactory evidence of deaths of fish or other animals must be furnished by the customer at his expense. In the event of the deaths of frogs or other animals, the feet may be cut off, packed in salt, and returned by parcel post on the date received. Our record of deaths or loss is less than one-tenth of one per cent.

Guarantee: All animals and plants, to our best knowledge and belief, leave our establishment in good healthy condition, and are properly crated or

packed. In the event of a loss through deaths in transit, and negligence cannot be traced to the express company, we will stand good for the loss (exclusive of transportation charges) only if a bad order report is taken and positive evidence furnished as above instructed. Either a refund will be made or a shipment of the number lost will be sent as a replacement, but transportation charges on the second shipment must be borne by the consignee.

This list cancels all previous lists.

SOUTHERN BIOLOGICAL SUPPLY CO., INC.

Established 1915.

Incorporated 1917.

April, 1932.



Useful Books on Aquiculture:

In press, "Handbook on Pond Fish Culture," by Percy Viosca, Jr., and "Handbook on Bullfrog Culture," by the same author. Announcement of publication will appear shortly.



View in Our Frog Pens

Note the abundant shade at the shoreline and on the banks. Water flag, Iris, is seen in the foreground, willow along the sides and background, and buttonbush in the water. The thousand-watt light furnishes insect food at night.



Bullfrog Spawn

A batch of bullfrog eggs about to hatch in one of our incubator pens. Some of the young tadpoles can be plainly seen on top of the lily pads. A large batch may contain 15,000 or more eggs.

HINTS TO AQUATIC FARMERS

BULLFROG CULTURE

We were the first to offer the Louisiana bullfrog as a superior subject for artificial cultivation, way back in 1915, and since that time have introduced them into practically every state in the United States, where their advantages over other species have been amply demonstrated. We have also introduced them into Canada, Mexico, Japan, Germany, Hawaii and other foreign countries where our methods of cultivation have been adopted and perfected. Although their rate of growth is naturally slower in colder climates, they will thrive anywhere between the Arctic and Antarctic circles except in salt water and cold mountain streams. Mountain water is suitable, however, if diverted into shallow ponds. The Japanese Government, after experimenting with many kinds of frogs from all parts of the world, has decided that the Louisiana bullfrog is not only superior as to size and flavor, but is susceptible to cultivation under a greater variety of conditions than any other species. Bullfrog culture is now a thriving industry in many parts of Japan.

Warning: Success in frog farming depends on starting with the right breed and species. These must be a hardy race and susceptible to cultivation. Our bullfrogs, *Rana catesbiana*, as well as all organisms described in this price list, have stood the test of artificial cultivation and can be propagated in captivity by methods worked out by us through years of experimentation. No larger species, and only one exists, the African bullfrog, has ever been cultivated in captivity.

Most bullfrogs reaching the commercial markets have been gaffed or gigged and are kept in wire crates or under crowded, unsanitary conditions. With such frogs the mortality, of course, is exceedingly high. Fly-by-night collectors sometimes offer special bargains in such specimens during seasons of plenty. Such parties often substitute other species, particularly specimens of *Rana grylio*, a smaller and less hardy species of bullfrog which is also found in Louisiana and the gulf coastal states. Being a more aquatic species, *Rana grylio* cannot stand the conditions of confinement and shipment required of a cultivable and marketable species. Our live bullfrogs are all hand-caught specimens of *Rana catesbiana*. They are handled from the moment they are caught until they reach the customer's hands under conditions which years of experience have taught us are proper for the species. We always endeavor, as far as practical, to keep them in confinement at least a few weeks before shipment, in order that any accidentally injured may be discarded and in order to accustom them to handling and feeding under captive conditions. As with other wild creatures, many individuals are very shy and do not subject themselves readily to domestication, some even refusing to feed in captivity. Herein lies another danger in buying wild stock from questionable sources.

PRINCIPLES OF BULLFROG CULTURE

Bullfrogs (*Rana catesbiana*) should be kept only in ponds, swamps or reservoirs which are free from game fish, snakes, turtles or other animals likely to destroy their eggs or tadpoles, the young frogs themselves, or the organisms upon which they feed. The water should not be deeper than is necessary to protect them from the heat in the summer and from freezing during the hibernating period in the winter. If sufficient shade is provided, twelve to eighteen inches is deep enough in the southern portion of the United States. In colder climates, at least part of the pond should be deeper than the greatest depth of the winter ice sheet. The shallower the water, the easier it will be to keep it free from game fish and other enemies, and besides, the animals upon which frogs feed thrive best in shallow water.

In temporary or concentration pens there should be at least one square foot of water surface for each frog during the summer, unless running water can be had. This should be sluggish, one complete change about twice a week being sufficient. In a balanced pond, where frogs are not overcrowded, no change of the water is necessary. In severe cold climates, breeding stock can be conveniently kept in a tank placed in a cellar or basement.



Partial View of Frog Pens

Bullfrogs and other frogs, alligators, turtles and other organisms are concentrated in large cypress-lined pens of varying size, where natural food, shade and other requirements are provided.

Growing Pens: The bullfrog is a shoreline creature and every effort should be made to increase the length of the shoreline. For growing or adult frogs, a number of small ponds is better than a large one, and elongated ponds or even a series of parallel ditches provide a greater shoreline than a round pond.

In artificially constructed projects, where natural swamps or marshes are not utilized, we recommend the construction of an alternate series of hills and ditches each about 6 to 8 feet wide, with the hills rising about 18 inches above the water level at the crest and the ditches about 18 inches deep down the center at the summer level. An outer levee should be arranged so that the entire area can be flooded in winter if necessary to prevent freezing to the bottom.

Breeding Ponds: Frogs should be paired one male to each female. Mating usually takes place during the late spring or early summer. The eggs



The Natural Haunts of the Bullfrog.

A shallow, well shaded swamp with a thick border of water flag (Iris) at the shoreline where the frogs spend most of the time while feeding.

are laid while the frogs are clasping, and if normal should float in a sheet at the surface of the water. The bullfrog egg mass covers from five to ten square feet. The eggs hatch usually within three days. Twelve pairs of breeders will produce enough tadpoles to stock a water area of 10,000 square feet if there are no enemies present. Some farmers prefer a breeding or incubator pen of smaller size and transfer the tadpoles to the larger area or tadpole pond just after the eggs hatch. In this case, allow at least 50 square feet of water surface to each pair of frogs in the incubator pen. Water lilies are excellent in such incubator pens, as the frogs like to spawn amongst them, but the tadpoles grow best amongst the other types of plants mentioned below.

Tadpole Ponds. In the southern states and other regions of similar climate, about half the tadpole crop transforms into frogs in the fall at the age of five or six months, the remainder staying in the water until the following spring at the age of approximately one year. In colder climates all tadpoles may remain in the water at least a year, and in the northern tier of states and Canada, two years. While with frogs, the number that can be maintained in a given area is proportional to the length of the shoreline; the tadpoles, on the other hand, require more water, and the number that can be reared is proportional to the pond area.

A pond of 10,000 square feet will produce on an average about 10,000 full-sized tadpoles in one to two years, depending upon the climate and the amount of organic food in the water. The water should contain submerged water plants in the deepest places for purifying and oxygenating the water and arrowheads or cattails for shade near the banks. These plants also serve as food for the tadpoles and for the organisms upon which the frogs feed. Abundant shade, especially along the banks, is necessary, hence sloping banks, shaded by overhanging cypress, willow, buttonbush, flags (*Iris*), etc., are desirable. A cypress or tupelo brake can be made into an ideal frog farm provided it can be drained periodically to remove game fish and other enemies before the eggs are laid.

Since the adult frogs will feed upon tadpoles or young frogs, they should be removed some time after the eggs have hatched, but not sooner, unless it can be done without disturbing the egg masses. It is usually a good plan to remove them after the breeding season, one to three months after the first eggs are laid, or after the males cease bellowing altogether.

Food Supply. In addition to the natural food in the water, tadpoles can be fed upon practically any dead animal or vegetable products that will be eaten by chickens or pigs, but it is found that with grain or starch foods, cooking renders them more digestible and they are not liable to foul the water.

Bullfrogs spend the greater part of the summer on the banks at the edge of the water, from which position they can jump at the moving organisms upon which they prey. They will eat only living organisms, which they swallow whole. They prey chiefly on crayfish, water bugs, beetles, small fish, small frogs, tadpoles and any of the small creatures generally found in ponds and ditches. They will take butterflies, dragonflies and other insects on the wing if opportunity presents. The largest bullfrogs prefer insects, fish and crayfish measuring from one to three inches long, and seldom leap at anything under one-half inch. As they cannot stand dry heat, their habits are chiefly nocturnal, especially during the summer.

The best rule to follow is to imitate a natural swamp, pond or marsh lagoon in which bullfrogs are known to thrive, keep game fish, snakes and other enemies out, and propagate and encourage food forms such as crayfish, greenfrogs, surface minnows, water bugs, tadpoles, etc. Keep the different sizes separated, as a frog can swallow anything that will fit in its mouth. Pro-



A Well Shaded Shoreline.

Crayfish, top minnows, insects and other creatures relished by frogs abound in such places and, therefore, more attention should be paid to the shoreline than to the pond proper.

vide both shade and sun, pure water and wide sloping banks. A windmill or pump can be used to maintain a constant level in a field, similar to rice culture. Provide snake and vermin-proof fences.

Fencing. Two types of fences are recommended above all others in connection with frog culture. For fencing in water we recommend No. 2 common cypress, 1 in. by 6 in. sheet piling, as illustrated on page 8. A strip of 2 by 4 cypress is nailed near the top on the pond side of each fence to keep it in line. This will also prevent frogs from climbing out in case they could get a foothold in the cracks. If likely to be bothered with minks, rats or cats, an 8-inch strip of galvanized sheet metal tacked on the outside near the top will prevent them from securing a foothold. Never use wire fencing of any kind in the frog farm proper as the frogs will scratch and bruise their noses in trying to escape. Make no angles in the outer fence at the corners but use curves.

For fencing on land we prefer a concrete base, T shaped in section, which supports the fence frame upon which is nailed galvanized sheet metal or cypress boards. If troubled with termites it is necessary to creosote the sill or put a strip of the metal to break the contact between the cement and the wood. A base board, preferably creosoted, may be substituted for the concrete but is not as permanent.

Productivity: Usually 100 per cent of the eggs laid hatch if they are unmolested by enemies. The amount of the tadpoles developed, however, is not proportional to the number laid but to the area and food supply, provided of course you have enough to start with. A conservative figure is one to the square foot, although several times this figure have been reared.

Adult frogs with plenty of food have been produced in the density of one specimen to each 2 to 4 feet of shoreline, although we doubt if this could be done in the north. We cannot give figures as to probable income, as conditions vary too greatly. We suggest that frogs be marketed in the winter when there is no competition from wild stock and prices soar. In the north they can be gathered and placed in concentration pens at the time of the first light freezes or dressed and kept on cold storage.

Accessory Ponds: Until a stock of food items is developed in the main frog producing areas, separate accessory ponds are recommended for producing the food items, such as greenfrogs, crayfish and top minnows. The succeeding crops of bullfrog tadpoles can also be reared in separate accessory ponds, at least after the cycle is started. Submerged water plants can also be propagated in smaller accessory ponds and the larger areas stocked as the specimens multiply. It is always good to have a reserve supply of each food item and water plant even after the main frog farm is well stocked.

In the accessory ponds, no fences are required for the crayfish, minnows, young tadpoles and water plants unless natural enemies, such as snakes, turtles, minks, etc., are likely to be numerous, or cattle or hogs have access to the area. The frogs themselves require fencing except on large open frog ranches.

GREENFROG CULTURE

The Greenfrog (*Rana clamitans*), although edible, is not so much in demand as the bullfrog, because of its much smaller size. We recommend greenfrogs because they adapt themselves to culture very readily and thus can be utilized as food for the medium and large bullfrogs. Their life history being shorter, a crop can be started at the same time, and even in the same pens as the bullfrogs, so by the time the bullfrogs come on, there will be an ample supply of food available. Greenfrogs can live under any conditions that are suitable for bullfrogs except for natural enemies. Snakes or other creatures which cannot eat an adult bullfrog because of its large size, can easily devour a greenfrog.



A Deep Water Swamp.

Frogs are not as abundant here as in a shallow swamp as they do not have the advantage of protective vegetation and fish can easily destroy their tadpoles and young.

Like the bullfrog, the greenfrog deposits its spawn during the spring and summer, depending upon locality and weather conditions. The egg films resemble those of the bullfrog, but are much smaller, seldom over a foot square. The development of the tadpole takes place in from a few months to one year. The young frogs will mature in a year. For the cultivation of the greenfrog, we recommend exactly similar conditions and pens as for the bullfrog, so that simplifies matters considerably. To insure a good crop, of course, bullfrogs must not be present, as they will devour them. Greenfrog culture is also much simpler than bullfrog culture, as they can be fed entirely upon insects, maggots and the like, until maturity. No separate brood pens are necessary for greenfrogs, for while they are somewhat cannibalistic, the few adults in a given area are negligible, and if crayfish, minnows, and insect food are abundant, they will not destroy their own young. These young are so large at transformation stage, that the adults will not try to devour them unless actually starved.

It requires nearly ten times as much brood stock to produce the same number of tadpoles as the bullfrog. However, if grown in separate pens, since we do not have to figure on as much cannibalism amongst the growing frogs, the number reaching maturity from the same number of eggs in a given area will be considerably larger. 100 pairs will produce approximately as many eggs as 12 pairs of bullfrogs. We therefore recommend this number to a pen of 10,000 square feet.

The greenfrog grows rapidly, and if food is plentiful, will reach maturity within a year after transformation. As a food supply for bullfrogs, however, it is not necessary to leave them reach maturity. A bullfrog pond may simply be stocked constantly from another pond with large greenfrog tadpoles, and the bullfrogs will devour them as fast as they transform and leave the water. Thus in from six months to a year, an abundant supply of wholesome bullfrog food will become available in virtually unlimited quantities.

CRAYFISH CULTURE

Our crayfish (*Cambarus clarkii*), live in fresh water in a habitat similar to that of the bullfrog. No equipment is necessary other than shallow water in ponds or ditches. The same equipment used in rice culture or bullfrog culture can be used for their cultivation. They can be cultivated the same as bullfrog tadpoles and in the same places, and make an excellent food for bullfrogs which feed on them. Crayfish feed on plant life in the water, pond weeds, etc., and their cultivation is easier than the bullfrog. They also feed on animal matter and small fish.

The young crayfish hatch in the fall and grow during the fall and spring, and even throughout the winter in the south. They are thoroughly aquatic

when young, hibernate under water, and reach maturity in late spring or early summer. In the summer the adults, after mating, dig holes at the edge of the water and while in these holes the females lay their eggs, which are carried under the abdomen or tail region. At the end of the summer, when the young are ready to hatch, the females go back into the water and after a few weeks the young take care of themselves.

An important point in the cultivation of crayfish is to keep out game fish which feed on them. Frogs will keep them thinned down but do not destroy them entirely. If game fish have access to the crayfish ponds, they should be drained once a year during the summer to remove these fish. This should be done when the adults are in their holes caring for their eggs.

Crayfish live excellently in rice fields and if these conditions are imitated, either with rice or other aquatic plants, you will have no difficulty. When the rice fields are drained, they return to the ditches or dig into the ground. The best plan, however, for a crayfish pond is to construct a series of hills and furrows inside the pond area. The hills should reach a few inches above the water level when the pond is full. This system gives a greater area of shoreline than in an ordinary pond. Since the number of frogs or crayfish that can be reared in a given area is not proportional to the area, but to the extent of the shoreline, several times as many of either species can be reared in the same area by following this advice.



The Creole Crayfish Net

Crayfish may be captured in simple nets baited with bloody meat or fish (beef pancreas or gills of large fish being the best). Minnow seines and dipnets are also used successfully.

The hills should be planted profusely in willows to provide the proper shade at the shoreline. The roots of these provide excellent hiding places for young crayfish, and during the breeding season, the adults tunnel among them. Cypress are also desirable but take many years to grow.

In the submerged furrows between the hills, arrowheads should be planted in profusion. Other water plants will do, but arrowheads are one of the best crayfish food plants. When the young crayfish crop comes on in the spring, it can be noted by the muddy water, and by their cutting down the plants. It is now time to provide extra food in the way of fish, meat, plants of any kind, potato (raw or boiled) and any kind of table leavings. Tadpoles and crayfish will live together and fortunately both are scavengers and will feed on the same substances.

It is a good plan to have an additional crayfish pond as well as rear them in the same ponds with the frogs. Thus there will be a reserve supply of food always at hand. They can be secured by netting, and the frog farm proper constantly re-stocked.

TOP MINNOW CULTURE

We would suggest that top minnows (*Gambusia*) be raised right along with the crayfish. These fish serve as added food for the crayfish and will also feed on mosquito larvae and therefore prevent a mosquito nuisance from developing in your crayfish pond. They are also fed upon by the bullfrogs and greenfrogs and besides keep the water clean. Top minnows can stand a certain amount of freezing over, but where the winters are very severe, breeding stock can be saved in a tank in a cellar, basement or greenhouse.

Other top minnows and killifishes, *Mollienesia*, *Fundulus*, *Cyprinodon*, etc., are desirable, but their culture in open water has not been perfected as yet. We recommend that all frog culturists experiment with various top water fishes, especially species native to their locality. Bottom species not only compete with the tadpoles, but cannot be caught by the frogs which feed only at the surface. Most top minnows feed on live *Daphnia*, insect larvae, etc., but will take bits of meat, shrimp meal, fish meal, etc. *Mollienesia* feeds chiefly on vegetable matter, and cooked starch foods, such as bread, oatmeal, potato, rice, etc., are taken readily in captivity.

AQUATIC PLANT CULTURE

Cultivation: As is the case with land plants, all water plants grow best when cultivated. Usually no hoe, rake or other garden implements are needed except occasionally to destroy or rake out undesirable growths. For best results, a pond should be laid dry and exposed to the sun for a month or more if possible. During this time it may be fertilized by scattering manure, hay, dead leaves, weeds, dead fish, or other organic material over the area. This

should be allowed to become thoroughly rotted. In connection with intensive fish or tadpole culture, a ton or two to the acre is not excessive. Flood and plant immediately after. Planting can be done before the water level is raised to the full height if that facilitates matters. Any undesirable growths should be removed when young or before they become firmly established, and in any event should never be allowed to go to seed. The types of aquatic plants used in water farming may be divided into five groups.

Group A—Water plants with more or less submerged leaves:

Wild celery is a valuable food plant and oxygenator. From 1,000 to 2,000 plants are required to stock an acre. It should be rooted in rich soil, preferably sandy, in water 1 to 4 feet deep. For very quick results plant about a foot apart in water free from crayfish, carp, turtles, ducks or other vegetable feeders. If this cannot be done, a separate pen or seed bed should be provided.

Muskgrass, coontail and various so-called **water weeds** and **pond plants** are all more or less useful in fish, frog or duck ponds, as they furnish food, oxygen and hiding places for aquatic life. They will grow by scattering in water 1 to 4 feet deep, and will root themselves. The average planting is about 5 bushels to the acre. They can be clamped together in small bunches by fastening the stems with little bands of sheet lead, and simply dropped overboard. The lead will cause them to sink and prevent the wind or current from carrying them into one side or corner of the pond.

Group B.—Floating Plants:

Water Hyacinths, Water Lettuce, Water Fern, Duck Weeds, etc. Not generally recommended for fish or tadpole ponds, as they limit the oxygen and become veritable pests. The water hyacinths and water lettuce are useful for gathering gold fish eggs which are laid among their roots. They are also excellent food plants for crayfish and pond turtles and can be cultivated for that purpose. A few are useful in small frog ponds if not allowed to become too dense. The duck weeds (*Lemna* and *Azolla*) are excellent foods for wild ducks. All floating plants are simply placed on the surface of the water.

Group C—Rooted Shallow Water Plants With Floating Leaves:

The floating leaf pond plant (*Potamogeton natans*), is one of the best of shelter plants for fish and the small animals upon which they feed, while their seeds are one of the favorite foods for wild ducks. The small thin leaves are not dense enough to exclude oxygen from the water below. These are planted simply by scattering or by weighting clusters with small bands of sheet lead.

Water Lilies. While excellent for the water garden, these are not recommended in shallow fish or frog ponds as they may cover the entire sur-

face and limit the light and oxygen supply, thus preventing maximum production of aquatic life. While big bass lurk around lily pads, the aquatic farmer must raise for quantity and not for size, especially in commercial projects where the owner wishes to make a profit. In deep water ponds, however, a few lilies along the shoreline can do no harm and are very ornamental. They are excellent in bullfrog incubator pens. Also for goldfish ponds, lilies do well, especially if prevented from taking the entire pond. This is best done by planting in pots, tubs or boxes. Lilies are simply rooted beneath the soil.

Group D—Shallow Water Plants With Emergent Leaves:

Arrowheads, sometimes called duck potatoes, are represented by several more or less ornamental species. Their roots should be planted beneath the soil in water from two to eighteen inches deep, preferably in clayey or alluvial soil. The early stage is thoroughly aquatic, a good oxygenator and a perfect food for crayfish and other water creatures. Also valuable where tadpoles are numerous. As the heat of summer advances, their leaves rise above the water and provide the necessary shade to prevent over-heating. For quick stocking, plant about a foot apart in water free from crayfish, carp, turtles or other vegetable feeders. If this cannot be done, a separate pen or seed bed should be provided, as these are perhaps the most valuable food plants for aquaculture.

Pickerel Plants should be planted in groups or clusters in from one to three feet of water, the groups being placed about 10 feet apart with spaces between them. A good plan is to use galvanized tubs or cypress boxes filled with dirt and submerged where wanted.

Lotus. While the lotus has beautiful emergent leaves, it also has floating leaves which limit somewhat the oxygen supply in the water below. Besides, the emergent leaves are large and umbrella shaped, thus excluding too much light from the water and preventing the growth of the submerged aquatic plants so necessary in fish, crayfish or tadpole culture. They are very ornamental, however, and can be kept under control by planting in tubs. American lotus seeds are a favorite food for wild ducks and are especially recommended for planting in duck ponds, about 15 lbs. to the acre being scattered about in water 1 to 3 feet deep during the fall of the year. The roots or tubers are simply planted beneath the soil in about 12 inches of water.

Water Cress is a useful edible ornamental plant, especially fine for salads. Also a good duck food.

Wild and Domestic Rice. In addition to the above emergent plants which are all suitable for planting in duck ponds and are excellent duck foods, we can supply wild rice (*Zizania aquatica*). About 60 lbs. of seed to the acre is the usual amount recommended. We also especially recommend domestic rice as a superior article for artificial duck ponds with water level control. Domes-

tic rice is inexpensive and its cultivation is simple in such ponds, since it is not necessary to maintain pure cultures, and no harvesting is required; the ducks themselves will attend to that. Plant 50 to 100 lbs. to the acre. Directions with each order.

Group E—Useful and Ornamental Shoreline Plants, Trees and Shrubs:

Water Iris, blue flag, purple flag, red flag, etc., are recommended above all else as they will grow in the shade of trees, will never “take” a pond or become pests, and for frog ponds, will provide just that added seclusion that frogs like at the water’s edge. These plants mat the soil and prevent wave wash on levees. Plant the roots in damp soil from 1 to 2 feet from the edge of the water, and from 6 to 12 inches apart. Where additional plants are desired for purely ornamental purposes, we recommend the **Egyptian papyrus**, the **arrow arum**, the **water canna**, the **cala**, and the **umbrella palm**. (See water garden section). The **cattail** and **bullrush** are sometimes useful if kept at the shoreline but may sometimes “take” a pond. If crayfish or turtles are abundant, however, they will be kept under control.

Willow, Buttonbush, Marsh Mallow, and Cypress: Plant along the shoreline in damp soil 2 to 4 feet from the water’s edge. Cover roots completely but do not plant too deeply. Plant willow, buttonbush, and marsh mallow 6 to 10 feet apart; cypress, 20 to 40 feet. Willow, buttonbush and marsh mallow are fast growing and provide good shade in 1 to 2 years, cypress in 10 years, so where cypress is desired, a temporary growth of fast growing trees is recommended. These can be thinned out later as the cypress foliage spreads.



The Motor Boat “Amoeba”.

For collecting frogs, tadpoles, and aquatic plants and studying their natural habits in our network of rivers, bayous and extensive swamps, a specially equipped motor boat is indispensable, for such creatures usually take up their abode far from the beaten path.

PRICE LIST

BULLFROGS AND TADPOLES

- L-1 **Bullfrogs** (*Rana catesbiana*). Giant Louisiana Race. Preferred shipping season, September 1 to May 1. Summer shipments with special packing. Unless otherwise requested, equal numbers of both sexes will be shipped. Largest Adult Breeders—\$3.00 per pair, \$15.00 per doz., \$100 per 100. On prepaid shipments add express charges on shipping weights of approximately 10 lbs. per pair, 16 lbs. per 3 pairs, 32 lbs. per doz., 250 lbs. per 100.
- L-2 **Giant Bullfrog Tadpoles**, nearly ready to transform, captive bred. Shipping season October 1 to June 1. \$1.50 per doz., \$10.50 per 100. Shipping weight, 5 lbs. per doz., 50 lbs. per 100.
- L-3 **Young Bullfrog Tadpoles**, 2 to 4 inches, fall delivery.....\$9.00 per 100
 One to two inches, late summer delivery.....\$6.00 per 100
 One half to one inch, early summer delivery.....\$3.00 per 100
- L-4 **Bullfrog Spawn**. As bullfrog spawn hatches within three days and should not be disturbed during that period, we do not recommend it to beginners. It can be supplied with special care in thermos jugs, but shipment of newly hatched tadpoles is far simpler. Newly hatched tadpole fry, available April to July, \$1.50 per 100; \$6.50 per 1000.



The Giant or "Jumbo" Bullfrog, *Rana catesbiana*

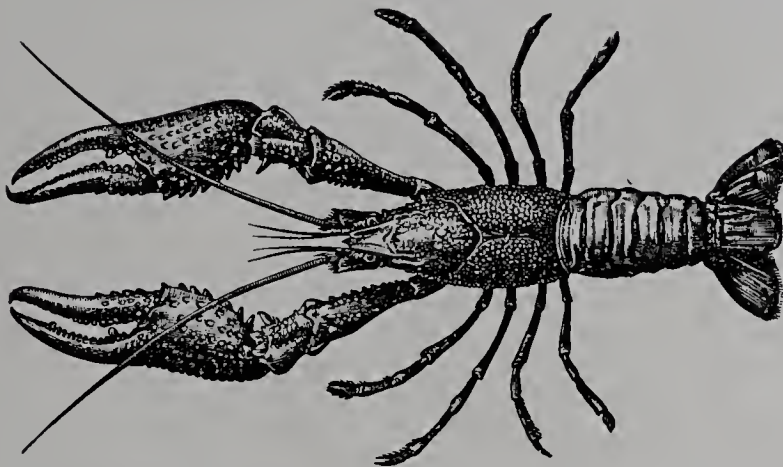
Adult specimens of this species, the largest of our frogs, measure from six to eight inches from the tip of the muzzle to the posterior end of the body, and reach a total length of 14 to 18 inches with the legs extended. Length, however, is a poor criterion of the size of a frog. Average size adults, when bulk is considered, are fifteen to twenty times the size of an ordinary frog. The superiority of our large bullfrogs over the smaller species, therefore needs no comment.

GREENFROGS AND TADPOLES

- L-10 **Greenfrogs** (*Rana clamitans*). Available entire year. Unless otherwise requested equal numbers of both sexes will be shipped. Largest Adult Breeders, \$2.50 per doz., \$15.00 per 100. Add express charges on shipping weights of approximately 10 lbs. per doz., 50 lbs. per 100.
- L-11 **Large Greenfrog Tadpoles**, October 1 to May 1, \$1.50 per doz., \$9.00 per 100. Shipping weight, 4 lbs. per doz., 25 lbs. per 100.
Shipping weight, 4 lbs. per doz., 25 lbs. per 100.

CRAYFISH

- L-20 **Crayfish** (*Cambarus clarkii*), swamp crayfish, February 1 to July 1. Breeding stock, in pairs—\$1.50 per doz., \$9.00 per 100. Shipping weights, approximately 10 lbs. per doz., 50 lbs. per 100.
- L-21 **Crayfish**, females each bearing 100 or more eggs or young. August 15 to November 15—\$6.50 per doz.
Shipping weight, approximately 10 lbs. per doz.



The Louisiana Swamp Crayfish, *Cambarus clarkii*

This is one of the chief natural foods of the alligator, turtles, bullfrogs, the large mouth black-bass, and other denizens of the swamps and lakes. It is also a human food and delicacy. It is a hardy species subsisting upon both plant and animal foodstuffs, it being especially fond of the succulent tubers and stems of aquatic plants. It can be cultivated anywhere in the United States. We can usually give twenty-four hour service during the shipping season, except that northern shipments are held back when severe weather is predicted for that section.

TOP MINNOWS

- L-30 **Top Water Minnows**, *Gambusia*, available entire year.
 Breeders, paired\$6.50 per 100
 Shipping weight, 40 lbs. per 100 fish.
 Special rates on larger quantities.
- L-31 **Forage Minnows**, *Mollienesia*, available entire year.
 Breeders, paired\$18.00 per 100
 Shipping weight, 100 lbs. per 100 fish.
- L-32 **Killifish**, *Fundulus*, available entire year.
 Breeders, paired\$4.00 per doz.
 Shipping weight, 15 lbs. per doz. fish.

POND FISH

- L-40 **Pond Fishes**. Captive raised fry, fingerlings, yearlings, or breeding stock of Black Bass, Bluegills, Warmouths, Bream, Pond Sunfishes and other food and game fishes suitable for pond culture, can sometimes be supplied. Shipping seasons vary with age or species. As prices vary with quantity, size, species and season, please send us complete information as to area, depth, water supply and nature of pond to be stocked, and we will make our recommendations and give quotations.

Our supply of these fish is short at this time, due to drainage installations in the vicinity of our ponds, but will be resumed as soon as our new plant is constructed.



Water Flea, Daphnia

The fish food supreme.

- N-5 **Daphnia**, the best live food for young fish, newts, aquatic salamanders, etc. Generous culture, with instructions for rearing.....\$1.50

ALLIGATORS



The American Alligator, *Alligator mississippiensis*

This American representative of the highest living reptiles, is becoming scarcer yearly and the future supply will come largely from alligator farms, of which there are several in Florida, Louisiana, California and other states. The alligator is very prolific, each female building a nest in which she deposits about 60 eggs yearly. The alligator is the only reptile which guards her nest and watches over her young. They are very hardy in captivity and will not die if properly protected from freezing. They will feed on small animals, meat of any description, sparrows, frogs, fish, crustaceans, and even insects such as beetles and grasshoppers. They must be given shade and sun, land and water in their pens.

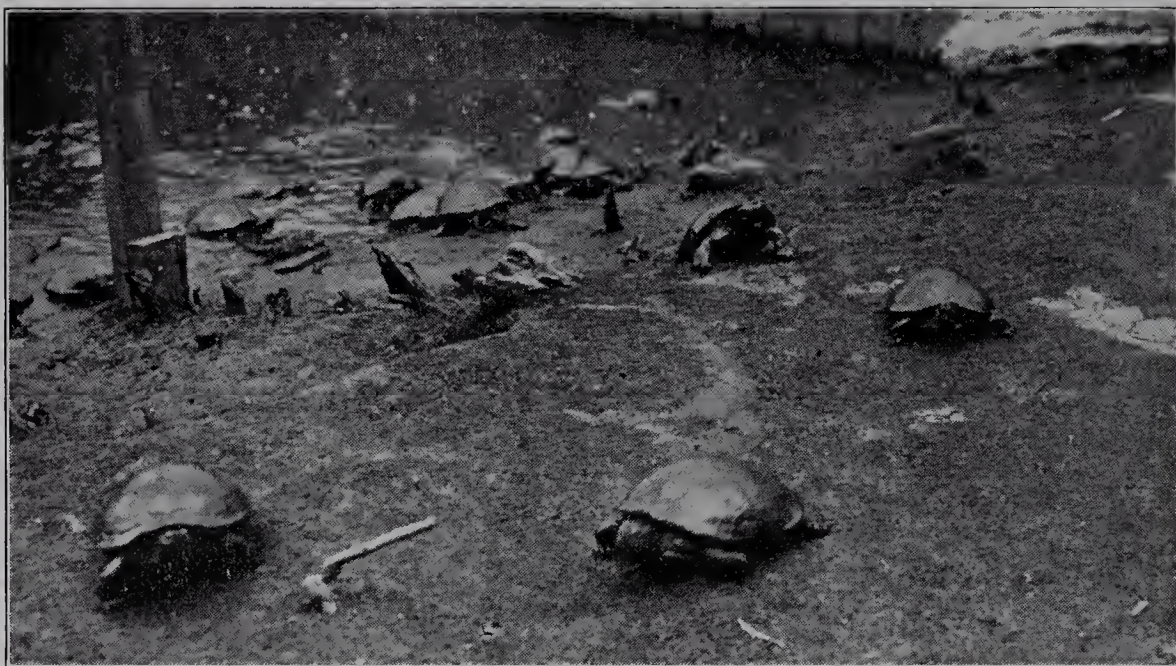
Alligators, available entire year, except in extreme cold weather.

		Less Than Twelve Each	Twelve or More Each
L-50	33-inch average	\$5.00	\$4.50
L-51	27-inch average	3.50	3.00
L-52	21-inch average	2.50	2.00
L-53	15-inch average	2.00	1.50
L-54	Babies, less than 12 inches.....	1.50	1.25

(Large sizes can be supplied—Prices on application)

TURTLES

- L-60 **Pond Turtles** (Cumberland, Mobilian or Freshwater slider Terrapin), available entire year, except in severe weather.
Large adults, in pairs.....\$2.75 per pair, \$10.00 per doz.
- L-61 **Snapping Turtles**, in pairs, 30c per lb. net, live weight at time of shipping.



Close-up in One of Our Turtle Pens

This unit pictured is forty feet square, and has a water area twenty-five feet square. Our largest unit of this type is 75x125 feet, with a water area 50x100 feet.

L-62 **Diamond Back Terrapin:** the genuine, world famous, Louisiana Diamond Back from the Gulf of Mexico. Entire year except in severe weather.

Large adults, in pairs.....\$6.50 per pair, \$35.00 per doz.

MUSKRATS

Domestic fur farming, the answer to a diminishing supply, is a comparatively new but profitable industry. Topping the list of fur bearers is that clean little animal the muskrat. The Louisiana muskrat, the "Hudson Seal" of commerce, leads all others in number and value, Louisiana exporting an average of six million skins annually with a value of nearly \$6,000,000 to the rat ranchers, on the trapping grounds. Muskrats can be raised along with bullfrogs in large penned areas.

L-70 **Muskrats;** the genuine Louisiana muskrat, so much in demand by fur farmers at the present time. Entire year.

Large adult females, each.....\$7.50

Large adult males, each..... 5.00

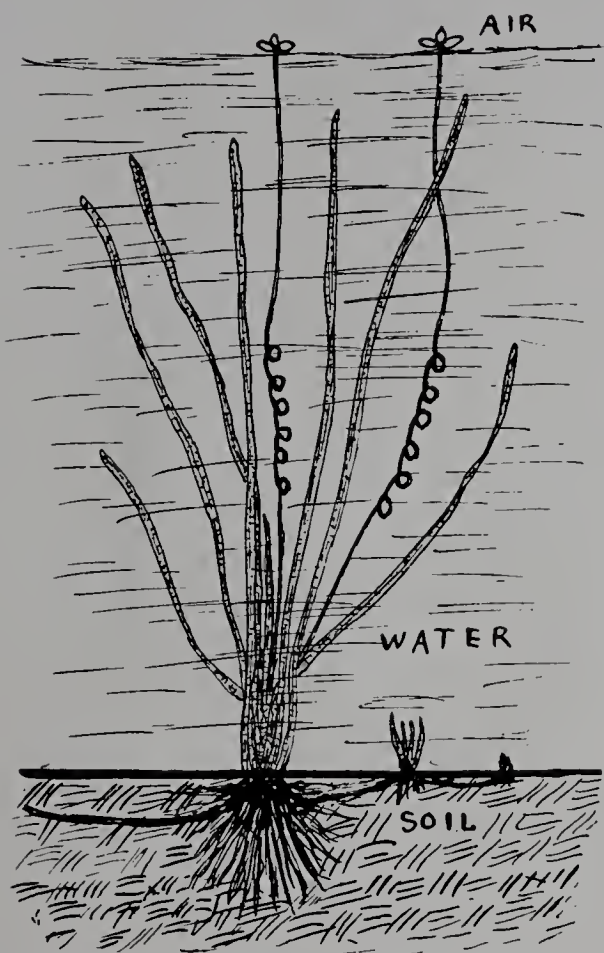
Other wild mammals, such as the o'possum, racoon, mink, etc., can be supplied on order.

SHORE AND WATER PLANTS USEFUL AS FOOD OR SHELTER FOR FROGS, TADPOLES, POND FISH, MUSKRATS, WILD DUCKS, ETC.

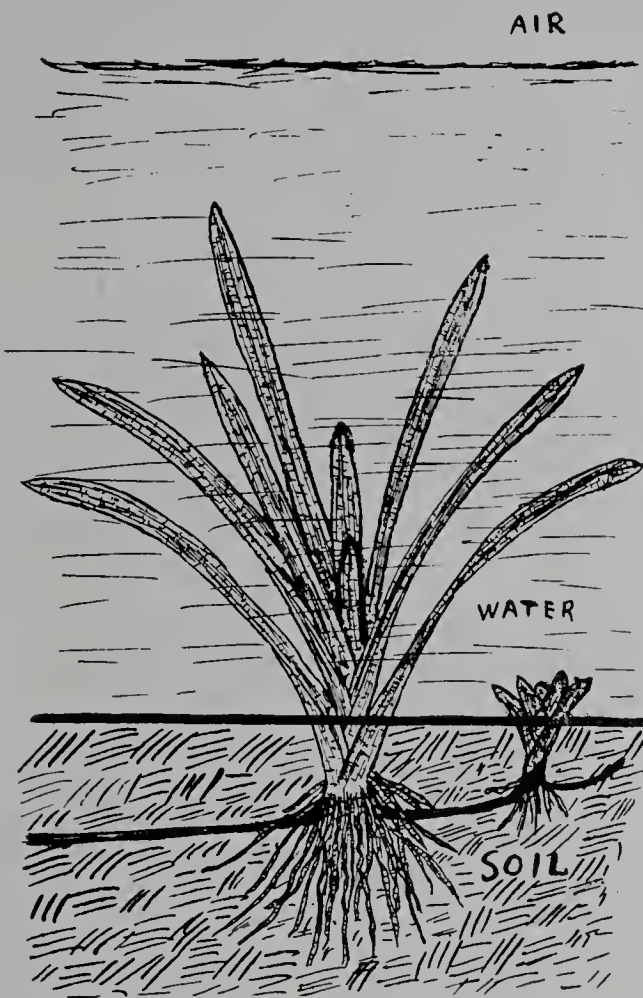
In addition to the species listed below, we can quote on many other species of aquatic plants, wild duck and muskrat foods. Special rates are quoted on large orders, 10 bushels or more. We shall be glad to advise plantings of large areas. Send specifications of area to be stocked, size, location, soil, water supply, etc.

Group A—Water plants with more or less submerged leaves:

- L-100 **Wild Celery**, tape grass (*Vallisneria spiralis*). Available entire year.
\$4.00 per 100, \$25.00 per 1,000.
- L-101 **Sago pond plant** (*Potamogeton pectinatus*). Available entire year.
\$6.50 per 100, \$55.00 per 1,000.



Wild Celery, *Vallisneria spiralis*



Submerged Plant of Arrowhead, *Sagittaria*

Two of the most valuable plants in water culture.



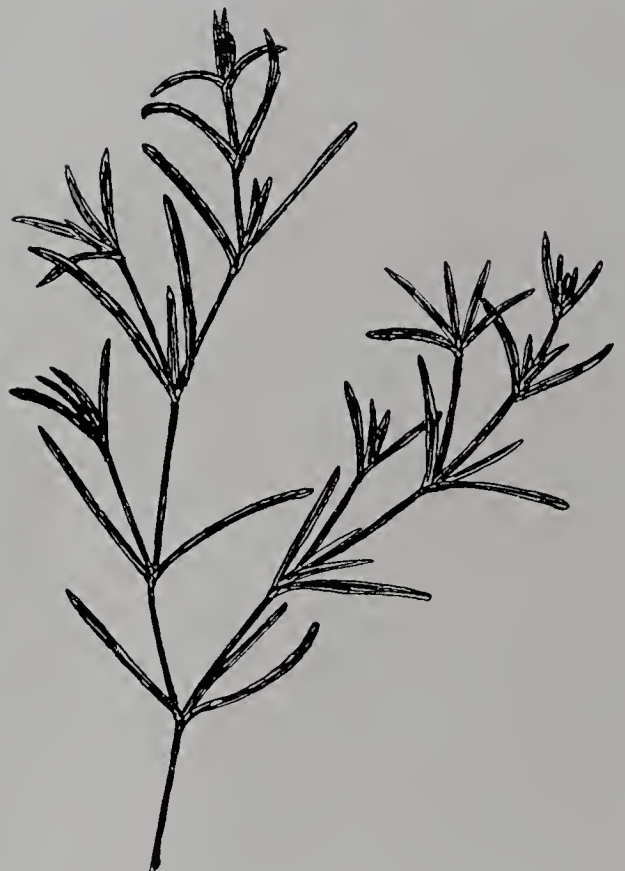
Fanwort, *Cabomba caroliniana*



Water Milfoil, *Myriophyllum spicatum*



Water Weed, *Elodea canadensis*



Fish Grass, *Potamogeton pusillus*

These are among the most valuable aquatic plants in fish, tadpole and duck ponds.

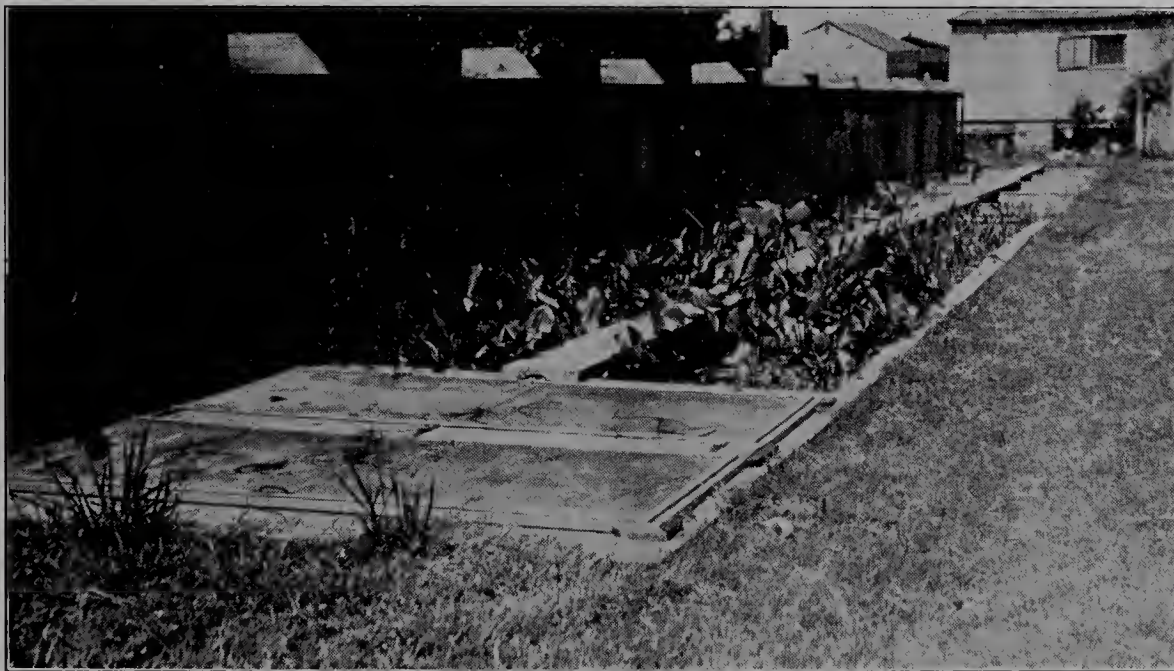
- L-102 **Fish Grass** (*Potamogeton pusillus*). Entire year.....\$6.50 per bu.
- L-103 **Water Weed**, ditch moss (*Elodea canadensis*), also called *Anacharis* or *Philotria*. Entire year.....\$8.50 per bu.
- L-104 **Coontail** (*Ceratophyllum demersum*). Entire year.....\$6.50 per bu.
- L-105 **Fanwort** (*Cabomba caroliniana*). Entire year.....\$7.50 per bu.
- L-106 **Muskgrass** (*Chara*). Fall, winter, and spring.....\$8.00 per bu.
- L-107 **Water Milfoil** (*Myriophyllum spicatum*). Entire year.....\$7.50 per bu.

Group B—Floating Plants:

- L-110 **Water Hyacinths** (*Eichornia crassipes*). Spring, summer and fall. \$6.00 per 100.
- L-111 **Water Lettuce** (*Pistia stratiotes*). Spring, summer and fall. \$8.00 per 100.
- L-112 **Duck's Meat** (*Lemna* or *Spirodela*). Entire year. \$2.00 per gal.
- L-113 **Duckweed**, small floating water fern (*Azolla*). Entire year. \$3.00 per gal.

Group C—Rooted Shallow Water Plants With Floating Leaves:

- L-120 **Floating Leaf Pond Plant** (*Potamogeton natans*). Entire year. \$10.00 per bu.



A Row of Concrete Ponds

Concrete ponds of about four hundred gallon capacity are used for rearing and storing aquatic plants, pond snails, *Daphnia*, goldfish and tropical fish, and many other organisms requiring such facilities.

- L-121 **White Water Lily** (*Castalia odorata*). Spring to fall. \$5.00 per doz., \$30.00 per 100.
- L-122 **Spatterdock**, yellow cow lily (*Nymphaea advena*). Spring to fall. \$5.00 per doz., \$30.00 per 100.
- L-123 **Banana Water Lily** (*Castalia flava*), lemon yellow flowers. \$8.00 per doz., \$50.00 per 100.

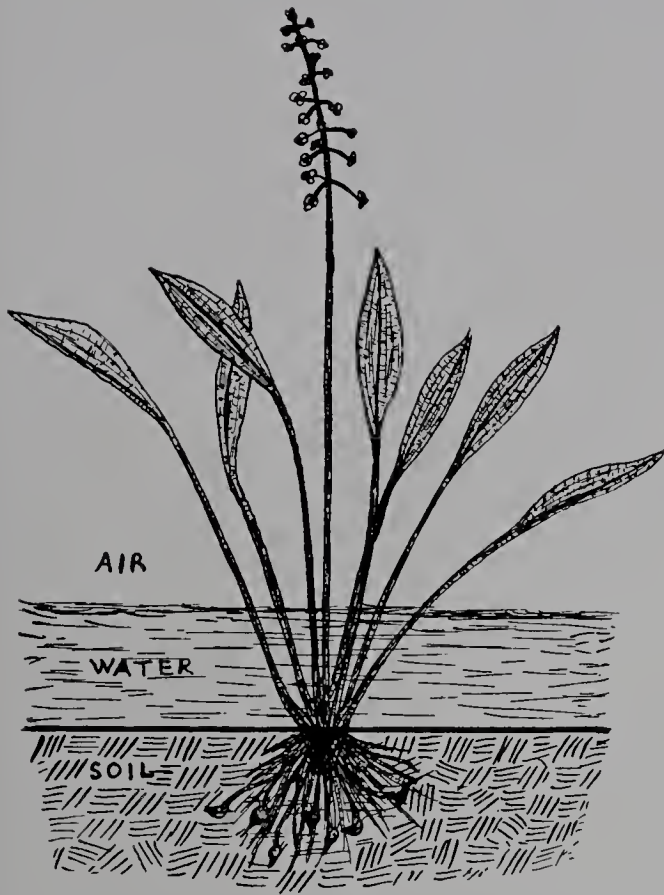
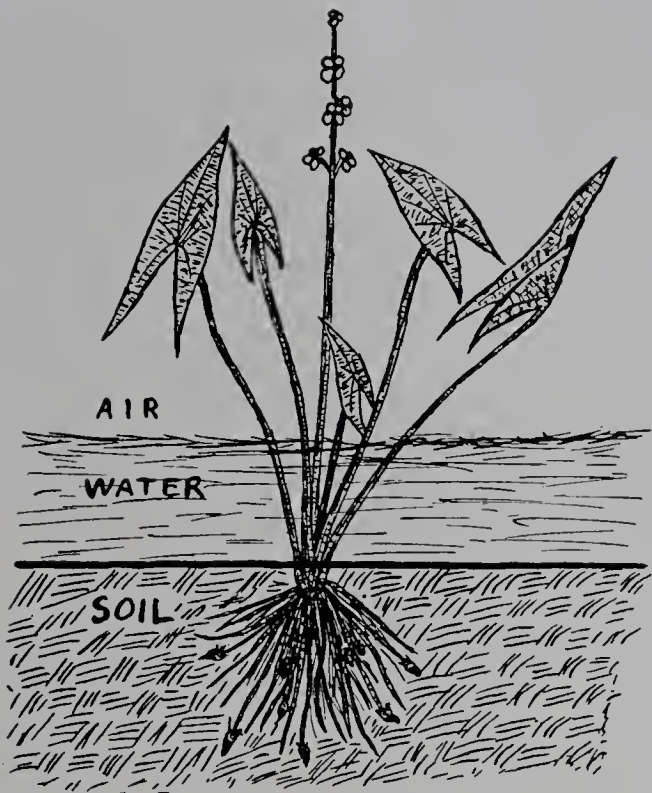


The White Water Lily, *Castalia odorata*

This hardy native water lily, which will grow anywhere in the United States, has one of the most beautiful and sweet scented of all flowers. We supply a dwarf form (minor) for aquaria as well as the large outdoor form. We also have the giant, white, closely related species (*lekophylla*).

Group D—Shallow Water plants With Emergent Leaves:

- L-130 **Wapato Duck Potato or Broad Leaf Arrowhead** (*Sagittaria latifolia*). Entire year. \$6.00 per 100.

Lance Arrowhead, *Sagittaria lancifolia*Wapato Arrowhead, *Sagittaria latifolia*

Two of the most valuable plants in aquiculture, duck ponds and water gardens.

- L-131 **Delta Duck Potato or Arrowhead** (*Sagittaria platyphylla*). Spring. \$7.00 per 100.
- L-132 **Lance Leaved Arrowheads** (*Sagittaria* sp.). Valuable in water culture. Entire year. \$5.00 per 100, \$30.00 per 1,000.
- L-133 **Pickereel Plants** (*Pontederia cordata*). Entire year. Root stock. \$3.00 per doz., \$20.00 per 100.
- L-134 **American Lotus Lily**, or water chinquapin (*Nelumbo lutea*). Seed for fall planting. \$1.50 per lb.
- L-135 **American Lotus Lily**, dormant tubers for spring planting or young plants in summer. \$1.50 each, \$15.00 per doz.
- L-136 **Water Cress** (*Roripa americana*). \$5.00 per 100, \$30.00 per 1,000.
- L-137 **Wild Rice** (*Zizania aquatica*). 75c per lb, \$60.00 per 100 lbs.
- L-138 **Domestic Rice** (*Oryza sativa*). Price depending on quantity and quality, let us quote. 5c to 10c per lb., less than 10 lbs, 25c per lb.

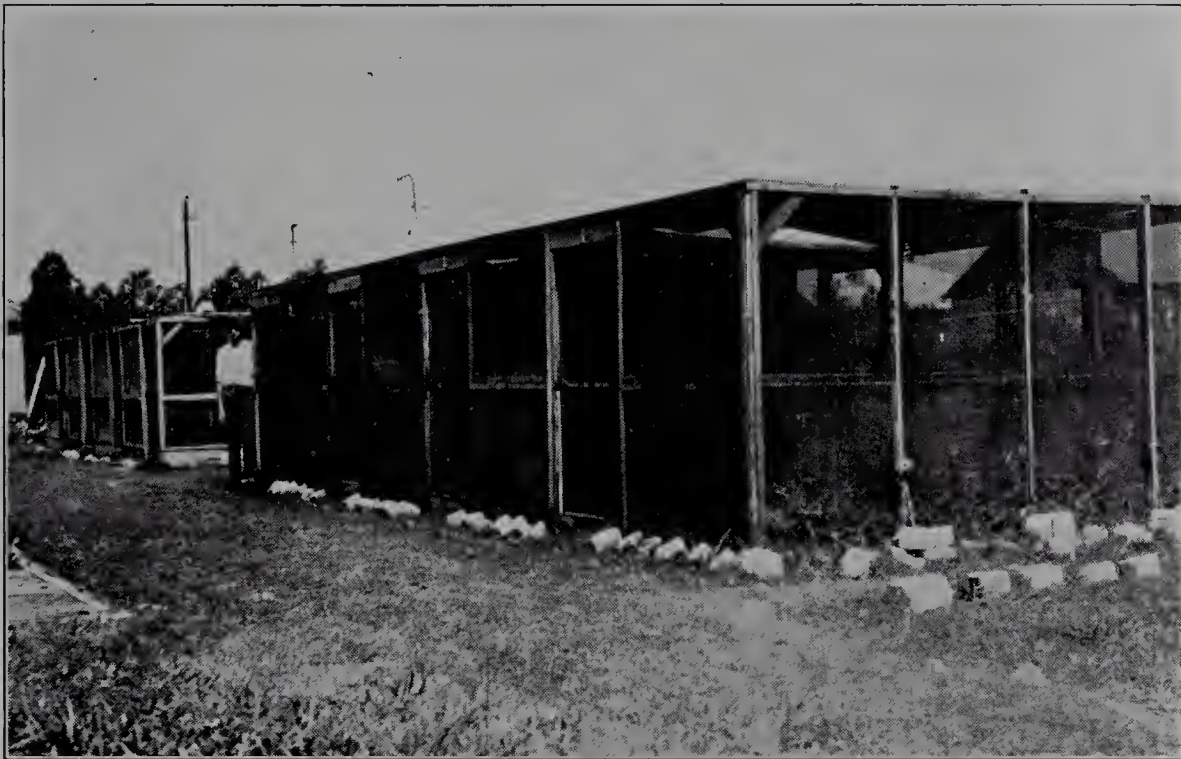
Pickerel Plant, *Pontederia cordata*Big Blue Iris, *Iris giganteaerulea*

These are ornamental as well as useful both in the water and on shore.

Group E—Shoreline Plants:

- L-140 Iris (*I. virginica*), lavender or purple flag. Entire year. Hardy roots or young plants, \$2.50 per doz., \$15.00 per 100.
- L-141 Iris (*I. fulva*), red flag. Entire year. \$3.00 per doz., \$17.50 per 100.
- L-142 Iris (*I. giganteaerulea*), giant blue flag. Entire year. \$3.50 per doz., \$20.00 per 100.
- L-143 Iris (*I. flexicaulis*). The best flag for dry situations, blue flowers. Entire year. \$3.50 per doz., \$20.00 per 100.
- L-144 Cattails (*Typha*). Entire year. Root stock or young plants. \$2.00 per doz., \$10.00 per 100.
- L-145 Bullrush (*Scirpus*). Entire year. \$3.00 per doz., \$15.00 per 100.
- L-146 Willow (*Salix marginata*). Entire year; best results October 1 to May 1. Young plants, one-half inch caliper. \$3.00 per doz., \$15.00 per 100.

- L-147 Buttonbush (**Cephalanthus occidentalis**). Entire year. Strong roots or young plants. \$5.00 per doz.
- L-148 Marsh Mallow (**Hibiscus sp.**). A wild hibiscus with white or pink flowers. Entire year. Strong roots, \$5.00 per doz.
- L-149 Cypress (**Taxodium distychum**). Entire year; for best results plant when dormant, November 1 to March 1. Young seedlings, \$2.50 each, \$24.00 per doz.



Row of “Man-Sized” Cages

Daphnia, Snails, Crayfish, Snakes, Lizards, Baby Alligators, Baby Turtles, and many other animals are kept in screened cages such as are pictured above. The individual units are eight feet high and provided with a sloping concrete tank seven feet square. Each is electrically lighted and provided with a separate water level regulator on the outflow.

NOTICE

If what you want is not listed, write for information or quotations.

If interested in aquaria or vivaria, or plants for the water garden, write for Catalog C.



Additional copies of this Catalog
may be secured from Southern
Biological Supply Co. Inc., at
15 cents per copy.



